READ THE OPERATING AND MAINTENANCE MANUAL

PROGRAMMING CONSOLE

Console functions

The console permits to:

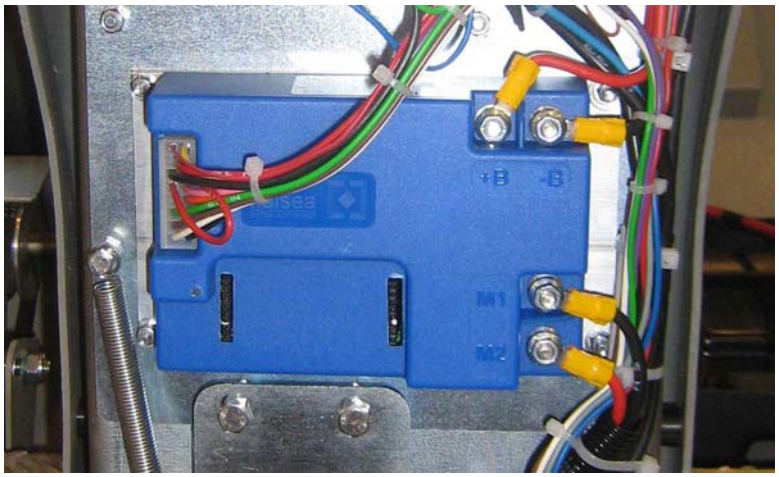
- program the chopper to custom-set the performance of the traction motor
- test electrical values and the state of the traction electric circuit
- read the type of alarm to make trouble shooting easy

Using the console

To engage the console *always keep to* the following sequence:

1. **TURN OFF** the main machine key
2. connect **the console** to the related connector (as shown below)
3. turn the key and work with the console
4. exit from all programs (main start-up heading) and **TURN THE MAIN MACHINE KEY OFF**
5. remove the console connector

A MISTAKEN SEQUENCE OF OPERATIONS CAN EASILY DAMAGE THE EFFICIENCY OF THE CHOPPER OR THE CONSOLE

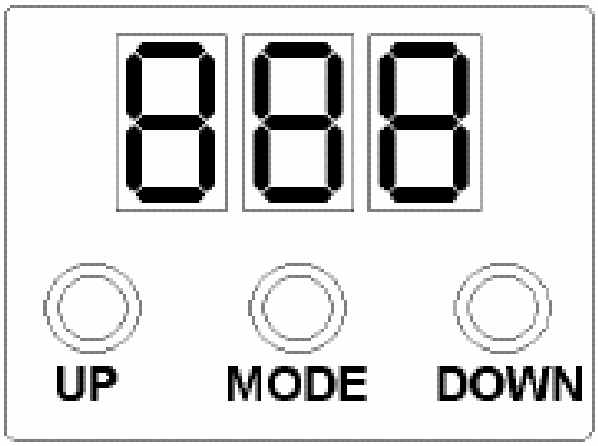


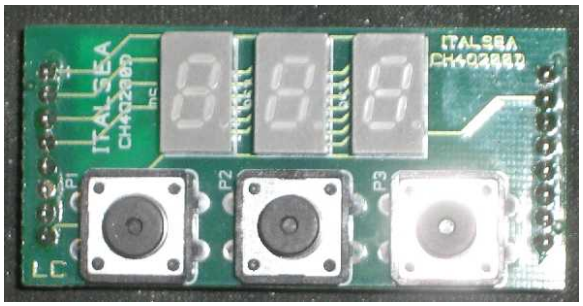
DIAGNOSTIC ALARM TABLE

Alarms or malfunctions cause the machine to stop and the corresponding alarm to appear on the display.

DISPLAY	ALARM	WHAT TO DO
A1	FORWARD GEAR ENGAGED AT START-UP	CHECK THE FORWARD GEAR MICROSWITCH
A2	REVERSE GEAR ENGAGED AT START-UP	CHECK THE REVERSE GEAR MICROSWITCH
A3	POTENTIOMETER JERKS	CHECK POTENTIOMETER WIRES
A4	POTENTIOMETER NOT ZEROED AT START-UP	SET THE AT-REST POSITION OF THE POTENTIOMETER
A5	THERMAL PROTECTION (trips when temperatures exceed 90 degrees, stopping the machine until the temperature drops below preset limits – check the temperature value with parameter F14=4)	CHECK MOTOR ABSORPTION – INCREASE HEAT DISSIPATION
A6	MOS SHORT CIRCUIT AT START UP	TURN OFF, CHECK AND RESTART CONNECTIONS. REPLACE THE DRIVE IF THE PROBLEM PERSISTS.
A7	BRANCH 1 CURRENT OVERLOAD	CHECK THE MOTOR OR REDUCE MAXIMUM CURRENT
A8	BRANCH 2 CURRENT OVERLOAD	CHECK THE MOTOR OR REDUCE THE MAXIMUM CURRENT
A9	UNDERVOLTAGE	VOLTAGE < 18V CHECK CONNECTIONS AND THE CROSS-SECTION OF POWER CABLES
A10	OVERVOLTAGE	VOLTAGE > 45 V
A11	AMPEROMETRIC PROTECTION	CHECK MOTOR CURRENT
A12	DISABLING	CHECK THE CONNECTION OF PIN 6
A13	SHUT-OFF ALARM	CHECK THE KEY AND RELATED CONNECTION
A14	EEPROM ALARM	TURN OFF AND ON AGAIN

CHOPPER PROGRAMMING





Press the “MODE” key to access programming functions.
The message related to the first parameter will appear (“F0”); press “UP” and “DOWN” to select the desired parameter.
Press the “MODE” push-button to enter modification mode. Use the “UP” and “DOWN” keys to set the desired value. Once you have selected the value confirm the new value using the “MODE” key.

PARAMETERS:

Name	Default	Min	Max	Description
F 0	0	0	2	Default parameters (F0=2), turn off and on again
F 1 *	50	0	999	IGSL
F 2 *	200	0	999	PGSL
F 3 *	70	0	999	IGCL
F 4 *	600	0	999	PGCL
F 5	20	5	50 Ramp	acceleration (10=1s)
F 6	10	5	50 Ramp	deceleration upon reversal (10=1s)
F 7	8	5	50	Deceleration ramp at stoppage (10=1s)
F 8	60	0	40	Current limit [A] - Imax
F 9	60	0	100	Reverse gear reduction [%]
F 10	0	0	2	Speed reference 0=potentiometer 0-maximum with 2 drive microswitches 1=wig-wag potentiometer with drive microswitch 2=wig-wag potentiometer without drive microswitch

Name	Default	Min	Max	Description
F 11 *	----	----	----	LPOT
F 12 *	----	----	----	CPOT
F 13 *	----	----	----	HPOT
F 14	2	0	99	MessageS on display: 0=absent 1=motor current [1=1A] 2=motor voltage [10=1V] 3=potentiometer voltage [10=1V] 4=heat sink temperature [°C] 5=battery voltage [10=1V] 9=software release
F 15	5	0	100	Electric brake release delay (10=1s)
F 16	0	0	20	Minimum speed (% compared to maximum speed)
F 17	20	0	20	Rated motor current – **In**
F 18	15	0	60	Amperometric protection trip time [s] at maximum current – **t**
F 19	15	5	50	Potentiometer dead band (10=0,1V)
F 20	0	0	1	Enable potentiometer calibration 0=disabled / 1 = enabled
F 21	0	0	100	Anti-crushing duration time (0,1 s)
F 22	100	0	100	Maximum forward speed [%]
F 23	1	0	2	Multimode input: 0=input inhibited, 1=speed reduction with Multimode command, 2=current reduction with Multimode command
F 24	60	0	100	Maximum speed in Multimode [%]
F 25	25	0	40	Maximum current in Multimode [A]
F 26	0	0	100	RxI [100=10% a 120 A (60 A)]
F 27	0	0	100	Anti-crushing mode speed [% of max speed] F27=0 DISABLE ANTI-CRUSHING MODE
F 28	0	0	1	Battery voltage [0 = 24V ; 1 = 36V] TURN OFF AND ON AGAIN TO CONFIRM
F 29 *	---	---	---	I_TAR
F 30	0	0	1	Key for accessing parameters (*)
F 31	1	0	1	Deactivation input logic [0=N.O. ; 1=N.C.]

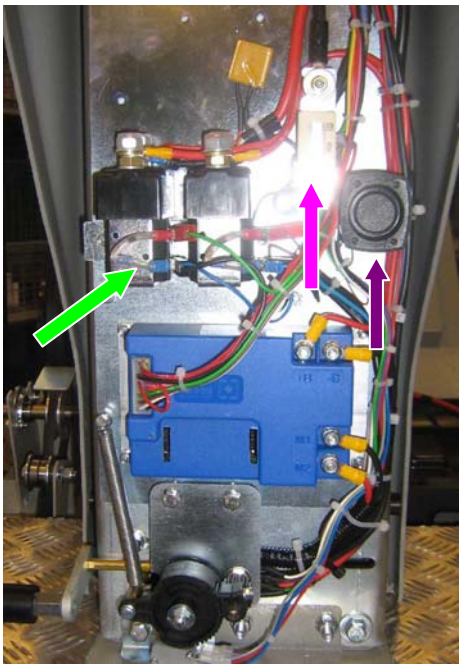
POTENTIOMETER CALIBRATION

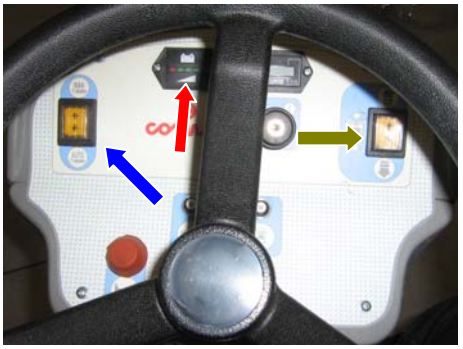
1. Connect the programming console to the card;
2. Set parameter F20=1 to access calibration;
3. Keep the “UP” and “DOWN” keys pressed for a few seconds;
4. The low flashing segment and the potentiometer voltage value will appear;
5. Turn the potentiometer to the desired rest position and confirm using the “MODE” key;
6. Turn the potentiometer to maximum reverse operation position and confirm using the “MODE” key;
7. The high segment and the potentiometer voltage value will appear;
8. Turn the potentiometer to maximum forward operation position and confirm with “MODE” to terminate calibration;
9. Set F20 = 0 to confirm the calibration setting;
10. Turn the machine off and on again.

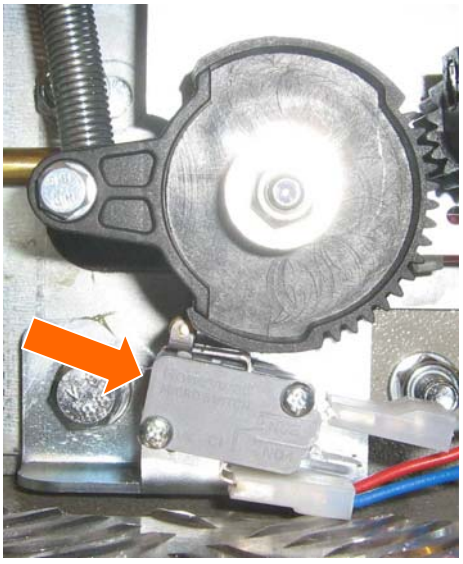
ELECTRIC PLANT TEST

1. Detach the battery connector.
2. Check that battery connection cables are clean and tight.
3. Check power cable connections and tightening: batteries, **remote control switches**, **fuses**, motors etc.
4. Check that **fuses** are properly installed and efficient.
5. Check the connections of the **microswitch**
6. Reconnect the battery connector
7. Turn the key to start the machine.
8. Check signal lamps and switches:

- check the efficiency of the **AUT/MAN brush drive switch** (during transfer, constant brush rotation, traction-controlled brush rotation);
- check the efficiency of the **battery monitor display;**
- Check that the **horn** operates.
- Check the **forward back switch**





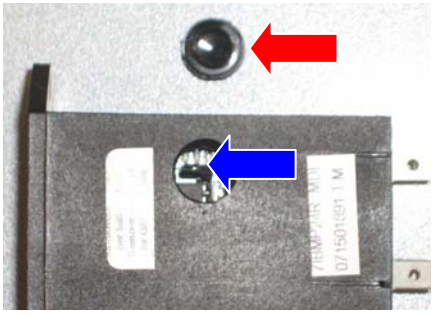


Battery check card adjustment

1. Check the battery level card set-up. This card can be setted-up by the battery type you use on your machine. You can set up for wet cell batteries or gel batteries.
2. Set up the battery card as follow:

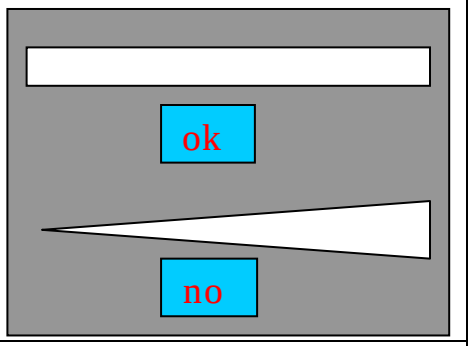
- Take off the **lid** which cover the jumper;
- Leave the **jumper** on if the batteries you use are wet cell type;
- Take off the **jumper** if the batteries you use are gel type;
- Put on the **lid**;

Check the battery card set-up everytime you change the batteries.



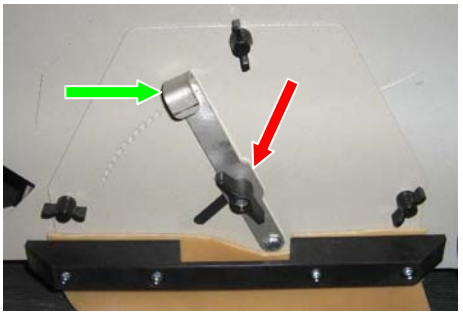
Adjusting the central brush

1. Set the machine on a flat surface and check that the impression left by the brush on the floor, when activated, is uniform on both sides.



2. If the impression is not uniform then check that the **brush adjustment lever** is at the same hole on both sides; proceed as follows if it is not:

- loosen the rod lock **wing nut**;
- position the lever in the desired adjustment hole;
- tighten the wing nut.



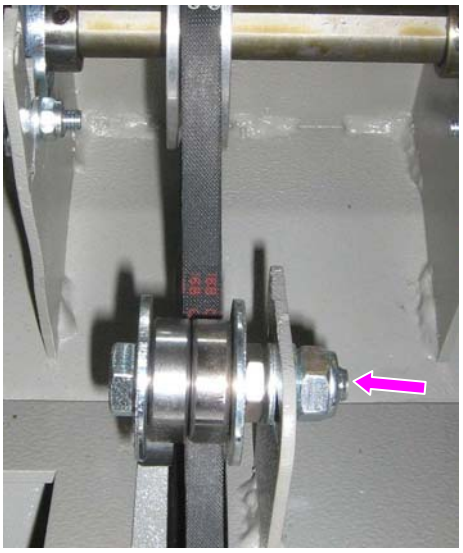
Adjusting the side brush and drive

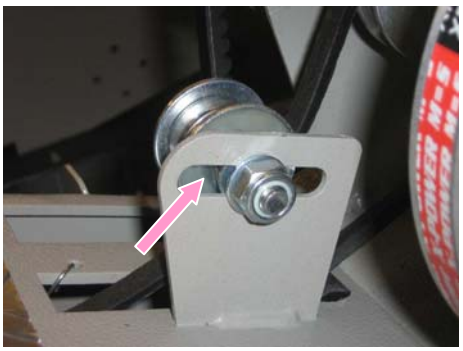
1. Drive belt tension: adjust the belt tension by loosening the M8 screw and moving the belt-stretching bearing support along the **sliding slot**.

2. Check motor brush wear and sliding capacity.

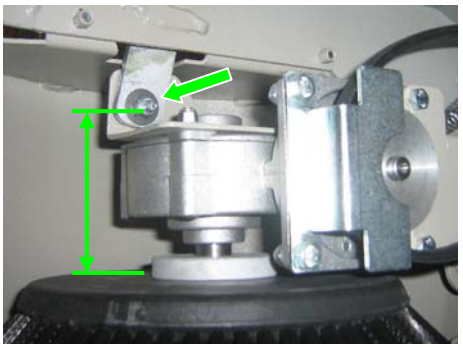
3. Use the **belt-stretching unit** to adjust drive belt tension and proceed as follows:

- loosen the **self-locking nut**;
- position the belt-stretching bearing unit 30-31 mm from the center of the screw at the front end of the slot, making sure that the side brush starts to rotate only when it is lowered;
- tighten the lock nut.

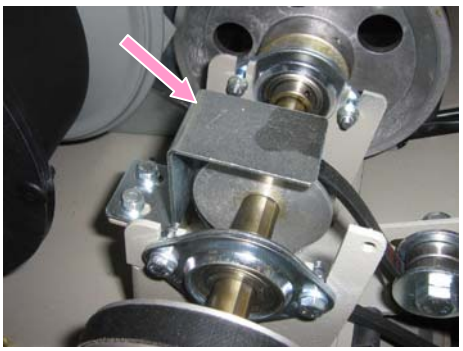




4. Check the adjustment of the side arm stop so that the distance from the center of the screw to the upper part of the brush is **85-87 mm**. As the brush wears or if you desire greater brush pressure you must adjust **screw M6** along the slot (upwards to lower the brush).



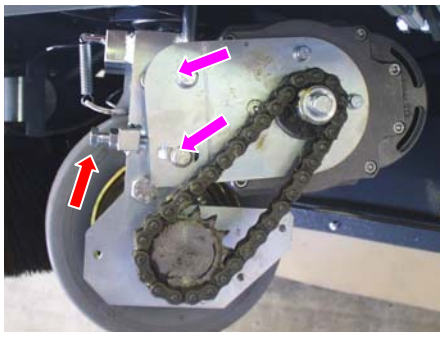
5. Position the drive pulley L-shaped protective **cover** so that 3-4 mm of distance remain from the belt both at the rear and at the top (in order to prevent the belt from abnormally moving out from the slot on the pulley). Do this by sliding the support screws along the slots.



Adjusting traction

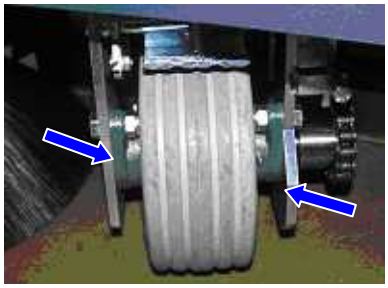
1. Adjust chain tension:

- loosen the **two M8 screws;**
- loosen the lock nut and adjust the **front screw** until the desired tension is achieved (check that tension is not excessive by subjecting the motor to force);
- tighten the lock nut;
- tighten the two M8 screws



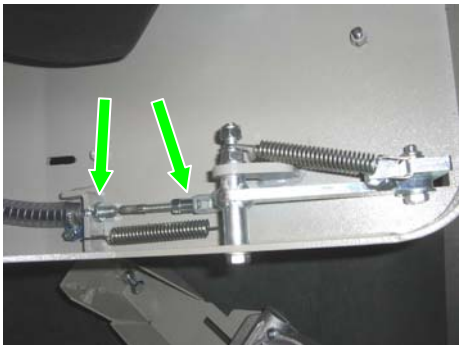
2. Grease the two wheel supports using their respective **grease nipples.**

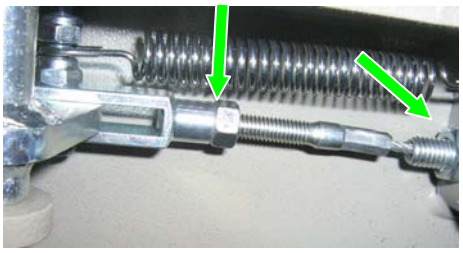
3. Check the wear and sliding capacity of the geared motor brushes.



Adjusting steering and brakes

1. Adjust the brake cable **sheath lock nuts** so that the brake shoe, when at rest, is about 3-4 mm from the wheel and that it stops the machine in about 1 meter (the machine must be braked when the second tooth on the pedal is engaged).

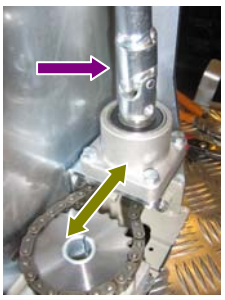


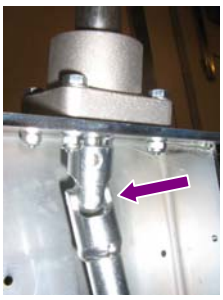


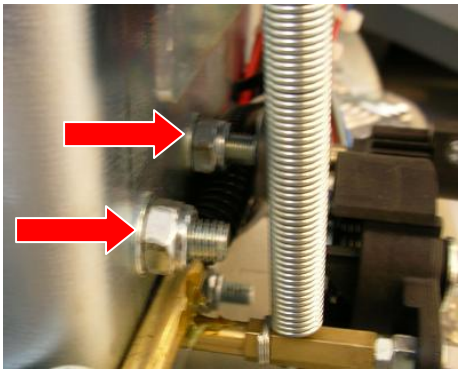
2. Check that the **steering box** and the **cardan joints** are proper oiled

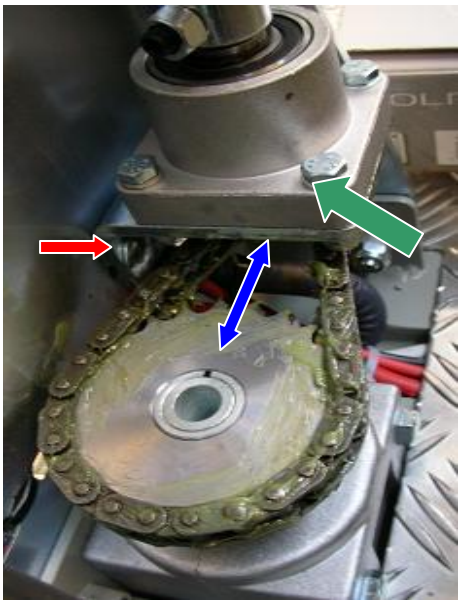
3. To regulate the steering chian pull act as follow:

- Unscrew the **M8 screws** which stops the **bottom steering bearing**, so the screws can move into thiers eyelets.
- Move the two **steering crown** until the chain pull is correct
- Block off the crown screwing the M8.



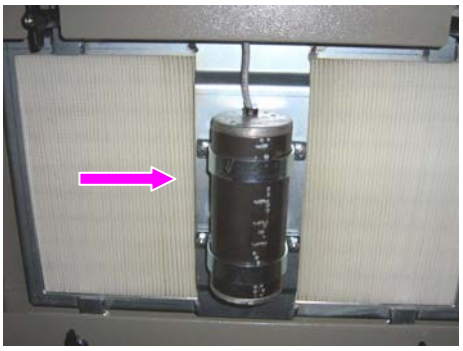




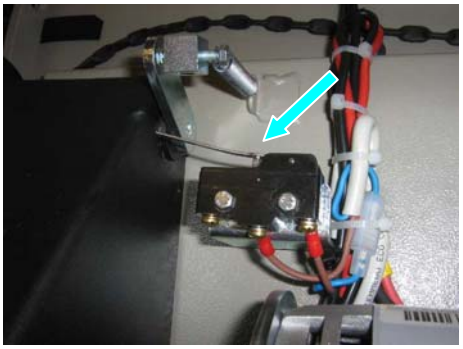


Testing suction

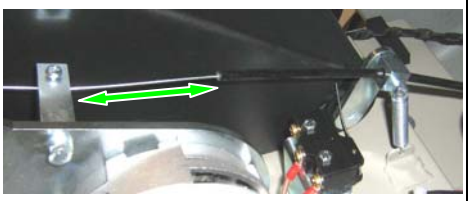
1. Check that the filter is clean and efficient.
2. Check that the air-filter panel seal is clean and efficient.
3. Check that the **filter-shaking motor** operates properly.

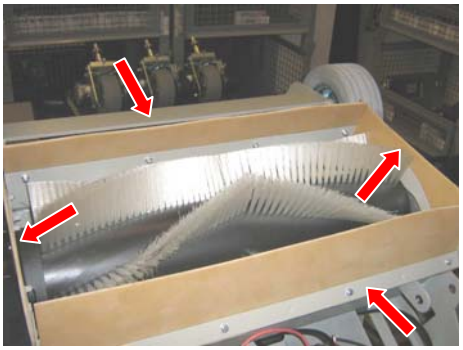
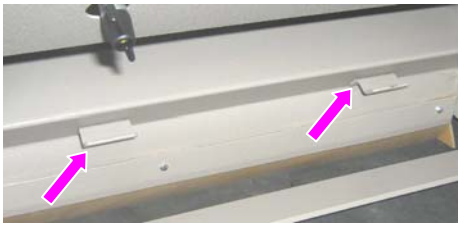


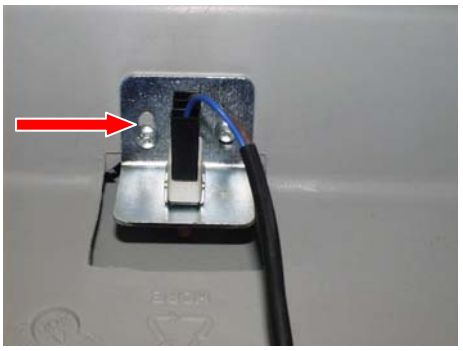
4. Make sure that, when you pull the suction cable, the filter-shaking motor starts to operate only when suction is off (with the suction door totally closed). Otherwise adjust the **microswitch** trigger, moving it along its support slots (see also the following pictures at point 5).



5. Check suction seal, checking the efficiency of the **suction door** installed behind the filter. If this is not the case then adjust the position of the steel cable so that the sheath is about **50 mm** from the cable stop.



6. Check that the **dust-guard rubber** placed in front of and behind the brush and on both sides of the machine are clean and efficient.	
7. Check the seal of the collection bin, adjusting its position as necessary using the two **supports,** making them slide along the slots.	

Adjusting the mini-seat	
1. Adjust the sensitivity of the mini-seat according to the weight of the operator by sliding its support along its **slots**.	

Funtional sweeper machine check

- ☐ Check the lamps switches and horn functionality;
- ☐ Check the seat microswitch functionality;
- ☐ Check the accelerator pedal functionality;
- ☐ Check the central brush functionality;
- ☐ Check the central brush motor functionality
- ☐ Check the lateral brush functionality;
- ☐ Checl the lateral brush motor functionality;
- ☐ Check the suction system functionality;
- ☐ Check the filter shaker functionality;
- ☐ Check the hand brake and service brake functionality;
- ☐ Check the steering functionality;
- ☐ Check the motors cables and connectors conditions;

Funtional sweeper machine test

- ☐ Adjust the central brush by a functional test;
- ☐ Adjust the kateral brush by a funtional test;
- ☐ Check the central brush uplift;
- ☐ Check the lateral brush uplift;
- ☐ Check the seat microswitch functioning;
- ☐ Check the suction system funtioning;
- ☐ Check the filter shaker funtioning;
- ☐ Check the main motor functioning;
- ☐ Check the brake efficiency. At maximun speed brake and verify that wheels block at simultaneously;
- ☐ Check the forward and back movement, acceleration and braking;

Final check

Check all funtions, sweeping suction, movement.